

## Plans for Radar Imaging of Asteroid 216 Kleopatra

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The available photometric, IRAS, occultation, and radar data suggest that Kleopatra's shape is extremely elongated, nonconvex, and possibly bifurcated, with a maximum dimension greater than 230 km. Kleopatra's radar albedo, the highest measured for a main-belt object, requires a very high surface bulk density that, given the asteroid's M classification, implies either a metallic composition and porosity typical of the lunar regolith or a regolith-free enstatite chondritic surface. The former is much more plausible; therefore Kleopatra may be a remnant of the core of a collisionally disrupted, differentiated asteroid. Kleopatra's fall 1999 opposition is the most favorable for radar until 2013. We plan an intensive campaign of delay-Doppler imaging to reconstruct the asteroid's detailed shape. The view will be a few tens of degrees from the pole, so the north/south ambiguity will be resolved easily and, given the anticipated echo strength, imaging with linear resolution of order 6 km should be possible. That level of geologic detail should define the asteroid's gross shape and also should reveal larger craters and any prominent topography. It also should define the radar scattering law, providing a very tight constraint on the Fresnel reflection coefficient and hence on the surface's bulk density and metal abundance.

### References

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